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ADVISORY CIRCULAR

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

SUBJECT: TAXIWAY CENTERLINE LIGHTING SYSTEM

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1. PURPOSE. This circular describes the recommended standards for design, installation, and maintenance of a taxiway centerline lighting system.

2. REFERENCES. Technical publications listed under Bibliography, Appendix 1, provide further guidance and detailed information as may be required.

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1. INTRODUCTION. Taxiway centerline lighting systems are designed to facilitate ground traffic under low visibility conditions. The taxiway centerline lights are primarily a ground traffic aid which provide positive visual guidance and supplement taxiway marking and other taxi guidance elements.

2. BACKGROUND. In the interest of safety, regularity, and efficiency of aircraft ground operations, taxiway centerline lighting systems were developed to be used in conjunction with other ground operation visual aids under limited visibility conditions.

3. IMPLEMENTATION CRITERIA. Install taxiway centerline lighting where a taxiing problem exists. Such problems include, but are not limited to, the following:

   a. Low Visibility. Where operations are authorized in low visibility.

   b. Operation Confusion. In ramp and apron areas where other lighting may cause confusion to taxiing or parking operations.

   c. New Construction. In new construction for complex taxiway systems instead of blue edge lights.

   d. Retrofitting. Retrofitting existing blue edge lights with centerline lights is not required until operationally justified.

4. CONFIGURATION.

   a. General. The taxiway centerline lighting system consists of single semiflush inset lights installed along the taxiway centerline in a straight line on straight portions, on the centerline of curved portions, and along designated taxiing paths in portions of runways, ramp, and apron areas.

   b. Longitudinal Spacing. Space light fixtures longitudinally as shown below for minimum authorized operations above and below 1,000 feet RVR. Allow a tolerance of plus or minus 10 percent of the longitudinal spacing specified to avoid undesirable spots such as rigid pavement construction joints. Locate taxiway light fixtures on the designated centerline of taxiing paths wherever possible. Displace taxiway lights a maximum of two feet where necessary to avoid construction joints or other undesirable spots. Apply this lateral tolerance consistently to avoid abrupt and noticeable changes in guidance; i.e., no "zigzagging" from one side to the other side of the centerline.

Longitudinal Dimensions

Centerline Curved Areas	Maximum Longitudinal Spacing	
Radius Feet	1,000 Feet RVR and Above	Below 1,000 Feet RVR*
125 to 399	25	12.5
400 to 1199	50	25
1200 to Straight	100	50
Long Radius Exits	50	50

(See Figure 1, Appendix 2)

* Install additional lighting and/or other devices, where required, to provide positive taxiing guidance where operations are to be conducted at reduced visibility conditions at or below 1,000 feet RVR.

c. Long Radius Taxi Exits Greater Than 1,200 Feet. Use the configuration illustrated in Figure 1, Appendix 2, to establish the starting point on the runway, spacing, and other details necessary to provide guidance to aircraft from the centerline into the "throat" of a long radius taxi exit.

d. Normal Taxi Exit. For normal exits, terminate taxiway centerline inset lights at the edge of the runways. Do not extend them into the confines of the runway. See Appendix 2, Figure 2.

e. Taxiways Crossing a Runway. Discontinue taxiway centerline lighting where taxiways intersect or cross a runway. Do not install lights within the confines of an intersecting runway. See Appendix 2, Figure 2.

f. Taxiways Crossing Another Taxiway. Continue taxiway centerline lighting across the intersection when a taxiway intersects and crosses another taxiway. See Appendix 2, Figure 2, for orientation and configuration of taxiway intersections.

g. Orientation of Light Beam.

(1) On Straight Portions. On all straight portions of taxiway centerlines, the axis of the light beam shall be parallel to the centerline of the taxiing path.

(2) On Curved Portions (Excluding Long Radius Exit Taxiways). Orient the axis of the two beams of bidirectional lights parallel to the tangent of the nearest point of the curve designated as the true centerline of the taxiway path. Orient the axis of a unidirectional light beam so that it is "toed-in" to intersect the centerline at a point approximately equal to four times the spacing of lights on the curved portion. Measure this spacing along the chord of the curve. See Appendix 2, Figure 2(a).

(3) Alternate Method on Curved Portions (Excluding Long Radius Exit Taxiways). See Appendix 2, Figure 2(b), for orientation and configuration of bidirectional and unidirectional fixtures for taxiway intersections, taxiway crossing a taxiway or a runway, and taxiway curves for operations down to 1,000 feet RVR.

(4) Long Radius Exit Taxiways. See Appendix 2, Figure 1, for details.

h. Reflective Markers. Supplement taxiway centerline lighting with reflective markers installed adjacent to the taxiway edge on paved fillets and on curves of radii less than 800 feet (measured to the taxiway centerline). Space reflective markers in accordance with the requirements of Advisory Circular 150/5340-15A, Taxiway Edge Lighting System. Supplemental reflective markers may be used in ramp areas.

5. DESIGN.

a. General. Make a design drawing indicating the dimensional layout of the taxiway centerline lighting systems prior to construction. Compare this drawing with appropriate drawings to assure proper location of the wireways and placement of equipment. Taxiway centerline light fixtures are designed for installation in new or existing rigid or flexible pavements. The preferred installation procedure for all types of pavements requires holes or drilled recesses for the inset light fixtures and provides sawed wireways (saw kerfs) in the pavement for No. 10 AWG wires from the edge of the taxiway to the fixture drilled recesses. Seal the inset fixtures and wires in the pavement with sealer material. Where justified, use alternate methods employing conduit and junction boxes instead of saw kerfs to run wiring to the inset fixtures.

b. Characteristics of Light Fixtures. Use semiflush light assemblies inset in the pavement for lighting taxiway centerlines. Maximum protrusion above the pavement surface of the light assemblies after installation shall not exceed 3/8 inch. Light emitted by the taxiway centerline lights shall be steady burning and the color shall be Aviation Green. Fixture assemblies may be either unidirectional or bidirectional, as required.

c. Selection Criteria. Use L-852 bidirectional wide angle light assemblies at the intersections of taxiways with taxiways, taxiways with runways, taxiways crossing taxiways and/or runways, at single taxiway curves, and on all straight sections of taxiways off runways. Use an L-852 unidirectional light assembly at the intersections of curves on single taxiways. Use L-842 bidirectional light assemblies on straight sections of taxiways (excluding straight sections of taxiways off runways to an intersection). See Appendix 2, Figure 2, for typical lighting configuration. Use L-842, Type I or Type II light assemblies as specified in Figure 1, Appendix 2, on the centerline of long radius exit taxiway curves.

d. Light Fixture Assembly Installation. One of three types of centerline taxiway light assembly installations is acceptable.

(1) L-852, Type II Light Assembly. The fixture is mounted on a base as described in Advisory Circular 150/5345-29. This method provides access to the fixture wire connections in the base which is installed in a hole 3/4-inch below the taxiway pavement surface and sealed in the pavement with sealing material.

(2) L-852, Type I, and L-842, Types I and II, Style A Assemblies. These fixtures are installed in a drilled hole with the one-inch perpendicular sides of the light assembly or base assembly flush with the surrounding taxiway pavement and sealed in the pavement with sealing material.

e. Power Supply.

(1) L-812 Constant Current Regulator. Provide a 4 KW or a 7½ KW constant current regulator having a primary rating of 240 volts, single phase, 60 cycles and a secondary rating of 6.6 amperes, designed for remote control with provisions for varying the output current to a lower value. Brightness control is achieved by varying the output current thus providing the desired light intensity for different visibility conditions. Use two brightness steps, 6.6 amperes, 100 percent and 5.5 amperes, 30 percent for taxiway centerline lighting systems. Determine KW size and the number of regulators for a specific 6.6 ampere series lighting circuit by using the curves in Appendix 2, Figure 3, of this circular.

(2) L-828 Constant Current Regulator. When the taxiway centerline lighting system design exceeds the 7½ KW capacity of an L-812 regulator, provide an L-828 constant current regulator conforming to AC 150/5345-10B. Determine the KW size and number of regulators for a specific 6.6 ampere series lighting circuit by using the curves as specfied in Appendix 2, Figure 3, of this circular.

f. Cable for Primary Circuits.

(1) Circuits of 3,000 Volts and Below. Use 3 KV, No. 8 AWG, Type B, stranded, single conductor direct burial cable.

(2) Circuits Above 3,000 Volts. Use 5 KV, No. 8 AWG, Type B, stranded, single conductor direct burial cable.

g. Lamp Load Circuits.

(1) General. It is important that when operating insulating transformers above specified load conditions, the transformer will in effect be operating in the area of manufacturer's design safety limits. Insulating transformers (200 and 300 watt, 6.6/6.6 amperes) are designed to operate between 6.53 to 6.7 amperes at designed full load and between 6.6 to 7.1 amperes at short-circuited conditions. However, it is possible for manufacturers, under some given conditions of steel purity used, to fully meet the specification requirements and yet when it is operated slightly above the specified full load could operate in a deeper state of saturation at current outputs of less than 6.53 amperes. Also, when operating the transformer below the specified full load it will be approaching the short-circuited operating condition of 7.1 amperes which could result in reduced lamp life. Where it is not possible to stay within the load limitations specified below, consider a larger size insulating transformer. An insulating transformer isolates the lamp from the high primary voltage series circuit. In the event of lamp burnout or an open insulating transformer secondary circuit, the circuit continuity of the primary circuit will not be broken.

(2) L-852 Light Assemblies. Use a 6.6/6.6 ampere, 300-watt insulating transformer. Use no more than four L-852 light fixtures connected in series on each 300-watt transformer. Limit the total resistance of No. 10 AWG cable used per station to 2.27 ohms. The 300-watt transformer secondary load should not exceed 359.3 watts.

(3) L-842 Light Assembly. Use a 6.6/6.6 ampere, 200-watt insulating transformer. Supply no more than four L-842 light fixtures connected in series on each 200-watt transformer. Limit the total resistance of No. 10 AWG cable used per station to 1.067 ohms. The 200-watt transformer secondary load should not exceed 226.5 watts.

h. Control Systems.

(1) General. Where possible, use simple switching to energize and de-energize the circuits or to control lamp brightness.

(2) Remote Control. Remote control systems are controlled from a panel located in the cab of the control tower or at some other location. Use the control panel recommended in Advisory Circular 150/5345-3A. This panel controls operating relays located in the vault, from which power is supplied to the taxiway centerline lighting regulators.

Use one of the following two systems of control voltages for remote control of taxiway centerline circuits:

(a) 120 Volts AC. Where the distance between the remote control panel and the vault is not great enough to cause excessive voltage drop in the control leads, use the standard control panel switches to operate the control relays directly. Operating relays supplying power to the taxiway centerline regulators must have coils rated for 120 volts AC. Use No. 12 AWG control cable to connect the control panel to the power supply equipment in the vault. Use the curves in Appendix 2, Figure 9, to determine the maximum permissible separation between the control panel and the vault for 120-volt AC control. Special pilot low burden auxiliary relays, having proper coil resistance to reduce control current, may be used to obtain additional separation distance with 120-volt AC control circuits. It may be advantageous to use these relays for expanding existing 120-volt AC control circuits. For typical applications, see Appendix 2, Figure 4, for 120-volt AC control circuits.

(b) 48 Volts DC. Where the distance between the control panel and the vault would cause excessive control voltage drop, use a low voltage (48-volt DC) control system. In such a system, sensitive pilot relays, such as those specified in Advisory Circular 150/5345-13, are activated by the remote control panel switches and, in turn, control the regulator relays through their contacts. Use a 25 pair, No. 19 AWG telephone cable to connect the control panel to the pilot relays. The DC control system is adequate for up to 7900 feet separation between control point and vault. For typical application details, see Advisory Circular 150/5345-3A and Appendix 2, Figure 4, of this circular.

(3) L-828 Regulator Control. Design control systems for the L-828 regulator as specified in AC 150/5340-13A. Instructions should be given to the tower operators to select either step 5, 100% brightness 6.6 amperes or step 4, 30% brightness 5.5 amperes or provide a method to eliminate the selection of brightness steps 1, 2, and 3.

i. Sectionalizing of Circuits for Traffic Control.

(1) General. Use circuit taxiway centerline lighting to permit activation of lights in various sections so as to delineate specific routes for ground movements and to control traffic where such control is determined necessary by consultation with air traffic control tower chief and airport sponsor.

(2) Selector Switch. Use a selector switch for special application to select short segments of separate taxiway centerline lighting circuits supplied from the same regulator. This switch can be remotely controlled from separately installed circuit breakers or a control panel conforming to Advisory Circular 150/5345-3A. This selector switch described in Advisory Circular 150/5345-35 is available in two types and is designed with contact rating of 6.6 amperes at 600 volts.

(a) Type I. Use Type I for control of a single series circuit.

(b) Type II. Use Type II for control of up to three series circuits.

(c) Combination of Selector Switches. Use combinations of Advisory Circular 150/5345-35, Type I and Type II selector switches to remotely control four or more series circuits.

(d) Maximum Power. The selector switch described in Advisory Circular 150/5345-35 is designed for a maximum of 600 volts, limiting its use on 6.6-ampere series circuits having a maximum connected load of 4 KW. For application of this selector switch, see Appendix 2, Figure 4, of this circular.

j. Supplementary Markers. Use reflective markers to supplement taxiway centerline lighting where operations are to be conducted where visibility is at or below 1,000 feet RVR. Install reflective markers adjacent to taxiway edges on paved fillets and on curves of radii less than 800 feet (measured to the taxiway centerline). Space the reflective markers in accordance with the requirements of Advisory Circular 150/5340-15A for spacing of taxiway edge lights. Supplemental reflective markers may be installed in ramp areas.

k. Duct and Conduit Systems.

(1) General. Make a thorough study of the taxiway centerline lighting layout prior to designing a duct or conduit system. This study will determine the exact location of the duct and conduit crossings under pavement so that connections for cable runs through other transverse ducts and conduits can be made, will determine where a reasonable number of spare ducts or conduits should be provided in each bank for maintenance and future expansion of facilities, and will determine where to avoid routing ducts or conduits through future facility areas which may have to be excavated.

(2) Cable Installation. In areas that are to be stabilized or surfaced, install cable runs for power supply and control circuits in ducts or conduits. Ducts and conduits in these areas will provide ready access for maintenance, modification of circuits, and protection for cables during repairs of the surfaced or stabilized areas. Assure that all duct and conduit dimensions and material meet National, State, or local electrical codes.

1. Vault. Design considerations for vaults and transformer housings are in Items L-109 and L-110 of Advisory Circular 150/5370-1A. Provide at least two square feet net vent area per 100KVA installed transformer capacity in the vault where the 24-hour average ambient temperature does not exceed 30 degrees centigrade or 86 degrees fahrenheit. Provide auxiliary means for removing heat where ambient temperatures exceed 30 degrees centigrade or 86 degrees fahrenheit. Install all vault equipment in accordance with local code requirements. See Appendix 2, Figure 5, of this circular for a typical vault detail.

6. EQUIPMENT AND MATERIAL.

a. General. Equipment and material used in a taxiway centerline lighting system listed below conform to the advisory circular and specification specified. All pertinent advisory circulars and specifications are referenced by number and title in "Bibliography," Appendix 1. Where Items P-606, P-605, P-610, L-108, L-109, and L-110 are specified below and in succeeding paragraphs, they refer to the specification items contained in Advisory Circular 150/5370-1A, Standard Specifications for Construction of Airports.

Equipment and Material Used for
Taxiway Centerline Lighting Systems

Equipment and Material	Advisory Circulars or Items	Specifications or Bulletins
L-852 Light Fixtures Types I and II	AC 150/5345-29	
L-842 Light Fixtures Types I and II, Style A	AC 150/5345-15	
Insulating Transformer L-834, Type II	AC 150/5345-22	
L-812 Regulators	AC 150/5345-11	
L-828 Regulators	AC 150/5345-10B	
Control Panel	AC 150/5345-3A	
Auxiliary Relay Cabinet Assembly	AC 150/5345-13	
No. 10 AWG Cable	AC 150/5345-30A	
No. 8 AWG Cable	AC 150/5345-7	
No. 12 AWG Cable	AC 150/5345-7	
Connectors	AC 150/5345-26	
Selector Cabinet Assembly	AC 150/5345-35	
Counterpoise Cable	Item L-108	
Conduit and Duct	Item L-110	
Concrete Backfill	P-610	
Sealer Material (Liquid and Paste)	P-606 (See Paragraph 6i)	
Joint Sealer, Type III	P-605 (See Paragraph 6i)	
Isolation Transformer, 300 Watt, 6.6/6.6 amperes		MIL-T-27535 MS-27134
No. 19 AWG Control Cable		REA Bulletin
Prefabricated Metal Housing	AC 150/5340-9	345-14

b. Vault. The vault should be of the type shown on the plans. Construction should be reinforced concrete, concrete masonry, or brick wall as specified. Use distribution transformers, oil switches, cutouts, and all regularly used commercial items of equipment not covered by FAA specifications which conform to the applicable standards of the electrical industry.

c. Light Base and Transformer Housing. Use a modified base and transformer housing conforming to Advisory Circular 150/5345-6 with a one-inch hub welded to the base at 90 degrees from the two existing two-inch hubs which are 180 degrees apart. Taxiway centerline lighting application requires the addition of the one-inch hub for secondary cable entrance. A gasket and suitable cover are also required for off-taxiway installation.

d. Squeeze Connectors. Use squeeze connectors, if specified, which are similar or equal to Crouse-Hinds Company Type CGK conduit-to-cable connector with neoprene rubber bushing.

e. Reflective Markers. Use reflective markers conforming to Military Specification MIL-R-7264B (USAF) and Federal Specification L-S-300; modify the reflector wicket support by welding a metal plate between wicket wire above ground for stabilization. After modification, wicket should be hot dipped galvanized.

f. L-852 Unidirectional Light Assembly. Where a undirectional L-852 light fixture is required, use an L-852 unit conforming to Advisory Circular 150/5345-29 and blank out one of the lens openings.

g. Preinsulated Connectors. When splicing the fixture leads to the No. 10 AWG wires, use preinsulated connectors suitable for installation in the wireways.

h. Auxiliary Relays. Where required use a hermetically sealed relay having a single pole double throw (SPDT) contact arrangement rated for 5 amperes at 120 volts AC and a coil resistance of 5000 ohms in a 120-volt AC control circuit. Relay connections may be either solder terminals or plug-in.

i. Optional Sealer Material. Other types of sealer material that provide satisfactory adhesive and waterproofing qualities may be used in lieu of sealer materials P-605 and P-606, upon approval of the engineer in charge.

7. INSTALLATION.

a. General.

(1) Cables, Vault, Vault Equipment, and Underground Duct and Conduit. Install cables, vault, vault equipment, and underground electrical ducts as specified in Items L-108, L-109, and L-110, respectively. A typical vault layout for taxiway centerline lighting systems is shown in Appendix 2, Figure 5.

(2) Insulating Transformers.

(a) Install no more than four L-852 (65 watts per unit) light assemblies in series on the secondary of a 300-watt insulating transformer. Total secondary load should not exceed 359.3 watts.

(b) Install no more than four L-842 (45 watts per unit) light assemblies in series on the secondary of a 200-watt insulating transformer. Total secondary load should not exceed 226.5 watts.

(3) Check all equipment and material before installation for conformance to specification requirements and to determine if the manufacturers are approved suppliers.

b. Installation Procedures.

(1) General. Exercise caution during installation in the vault and on the runway to prevent the collection of foreign matter in equipment and on operating components. Collect and remove all installation residue as the installation progresses. Use a cover or shield, where required, to protect components from foreign matter during installation.

(2) L-852 Type I, L-852 Type II, and L-842 Types I and II, Style A Light Assemblies.

(a) General.

1 Rigid or Flexible Pavements. The installation procedure for taxiway centerline light assembly and base assembly is the same for new or existing rigid or flexible pavements. Holes or recesses are drilled in all types of pavements to accommodate the light assembly and/or base assembly. Wireways (saw kerfs) are sawed in the pavement to accommodate the electrical circuits. Extra depth and special treatment are required where wireways cross rigid pavement joints. The extra depth and special treatment are in accordance with the appropriate plans. Typical installation details are shown in Appendix 2, Figures 5, 6, 7, and 8.

2 Pavement Drilling and Sawing. Drill holes and saw wireways for fixture assembly, bases, and wires, respectively, into the pavement surface at the locations shown on the plans. Standard sawing and coring equipment normally used on pavements may not be adaptable. Use the type coring and sawing equipment for a particular pavement in accordance with equipment manufacturer's recommendations. Drill holes in the pavement not less than 8-1/2 inches in diameter for each type of light assembly and/or base to allow 1/4 inch clearance for sealer material between the sides of the light assembly and/or base assembly and the sides of the drilled hole. Drill depth of the hole to allow 1/4 inch clearance for sealer material between the bottom of the light assembly and/or base assembly and the bottom of the drilled hole. See typical installation details shown in Appendix 2, Figures 6 and 7.

(b) L-852, Type I Light Assembly and L-842, Types I and II, Style A Light Base Assembly. Use the following consecutive steps to install the L-852, Type I light assembly and the L-842, Style A light base assembly in the pavement as shown in Appendix 2, Figure 6.

1 Step 1. Prior to placing the L-852, Type I inset light assembly or the L-842, Style A light base assembly in the drilled hole, clean all external surfaces of the assembly that will make contact with sealer (sandblasting may be necessary) and clean the sides and the bottom of the hole by sandblasting, flushing with high velocity air jet or wiping dry to assure an adequate bond between the assembly and sealer. Do not handle the assembly by the lead wires. It is recommended that a jig be installed on the assembly to hold and position the assembly. A one-degree deviation of the arrow, provided on the top surface of the assembly to obtain proper alignment, from the line parallel to the taxiway centerline, or from the line bisecting the orientation points on curved portions of taxiway centerlines specified in notes (a) and (b) on Figure 1, Appendix 2, will be an acceptable tolerance.

2 Step 2. Place a sufficient quantity of P-606 paste type sealer material in the bottom of the drilled hole which can be forced up a maximum of 1/8 inch around the fixture assembly or base assembly to assure a bond between the bottom of the fixture assembly or base assembly and the drilled hole. Cover completely the bottom of the light assembly or base assembly with P-606 paste sealer material. Use the arrow on the fixture assembly to obtain alignment parallel to the centerline and then place the fixture assembly in the hole. Apply pressure on the top of the fixture assembly to position and to force the sealer material in the hole up the sides of the light assembly or base assembly at least 1/8 inch. In the event a jig is not used in this step, check the final position of the light assembly or base assembly to assure that the top of the one-inch perpendicular sides of the light assembly or base assembly is flush with the surrounding pavement surface and oriented properly. Place a weight on top of the light assembly or base assembly to assure that the assembly will remain in final position. Leave the weight and jig in place until the sealer material reaches its initial set.

3 Step 3. Remove the weight and jig, place assembly wires in wireways as specified in paragraph 7b(2)(e)2, and place temporary plug in the wireways to block sealant entrance into sawed wireways. Then fill all voids present around the fixture assembly or base assembly with P-606 liquid sealer material. Remove all excess sealer material from the top of the fixture assembly or base assembly, all assembly cavities, and the pavement.

4 Step 4. Where the type inset assembly used in the installation contains an insert optical system or a top assembly, install this system into the fixture assembly or base assembly in accordance with the manufacturer's instructions. Care should be taken to properly seal all gaskets. Tighten all screws, bolts, or other securing hardware with a torque wrench or screwdriver to the manufacturer's recommended torque.

(c) L-852, Type II Light Assembly. Check each plywood cover to assure that the reference arrow coincides with the light axis of the light assembly before installing the base assembly in the pavement. Use the plywood cover with a jig installed on it during installation. Install the base assembly in the following consecutive steps:

1 Step 1. Prior to placing the base assembly in the drilled hole, clean all external surfaces (sandblasting may be necessary) of the base assembly that will make contact with the sealer. Also to ensure an adequate bond between pavement material, sealer material, and base assembly, clean the sides and bottom of the drilled hole by sandblasting, flushing with high velocity air jet, or wiping dry to ensure an adequate bond between pavement material, sealer material, and base assembly. It is recommended that a jig be installed on the plywood cover to hold and position the base unit. A one-degree deviation of the arrow provided on the top of the plywood cover to obtain proper alignment, from the line parallel to the taxiway centerline, or from the line bisecting the orientation points on curved portions of the taxiway centerline specified in notes (a) and (b) on Figure 1, Appendix 2, will be an acceptable tolerance.

2 Step 2. Place a sufficient quantity of P-606 paste sealer material in the bottom of the drilled hole to allow not more than 1/8-inch of sealer material to be forced up around the base unit sides to assure a bond between the bottom of the light base assembly and drilled hole. Cover completely the bottom of the light base assembly with P-606 paste sealer material. Use the arrow on the top of the plywood cover to obtain alignment parallel to the orientation points specified in Step 1 above and then place the light base assembly into the hole. Apply pressure to the top of the light base assembly to position and force the sealer material up the sides of the light base assembly. In the event that a jig is not used in this step, check the final position of the light base assembly to assure that the flange area of the base is 3/4-inch below the pavement surface. Place a weight on top of the base assembly to assure that the base assembly will remain in final position 3/4-inch below pavement surface. Leave the weight and jig in place until the sealer material reaches its initial set and until ready to place No. 10 AWG wires in the wireways and into the base unit.

3 Step 3. Remove the weight, jig, and plywood cover. Place the No. 10 AWG wires in the wireways and into the base unit as specified in paragraph 7b(2)(e)3. Place temporary plugs in each wireway to block wireways at their recesses and block all light base assembly wire entrances with electrical insulating compound. Then fill all voids around the base unit up to the top of the base unit flange with P-606 liquid sealer. Splice the base assembly wire leads to the No. 10 AWG wires in the base as specified in paragraph 7b(2)(e)3. Remove all sealer material from the base flange and pavement.

4 Step 4. Clean and dry out the light base assembly as required. Place the furnished 5-3/4-inch diameter by 3/4-inch thick closed cell foam block in the base to act as a cushion and to prevent ice damage to the light in freezing weather. Install the light assembly on the base unit in accordance with the manufacturer's instructions. Care should be taken to properly seal all gaskets. Tighten all screws, bolts, and other securing hardware with a torque wrench or screwdriver to the manufacturer's recommended torque.

(d) Wireways. Depth and width of wireways shall be as shown on the plans. Prior to the installation of No. 10 AWG wires in the pavement, all vertical edges in the wireways are chamfered at intersections, wireways are sandblasted, flushed with a high velocity air jet, or wiped dry to ensure proper bond between the pavement material and sealer material. Typical sawing details and layout are shown in Appendix 2, Figure 6.

(e) Wires.

1 General. If the installation is made in stages, adequately tape the ends of exposed wire to prevent the entrance of moisture. Make no splices in the single conductor wires except at each light fixture.

2 L-852, Type I and L-842, Style A Light Assemblies. Place the No. 10 AWG wires in the wireway from the transformer near the taxiway edge to the inset assembly leads. Use an adequate number of wedges or similar devices to hold the wires in place at least 1/2 inch below the pavement surface. Keep all devices used to hold wires in place to a minimum thickness so that there will be a maximum of sealant over them. Splice the No. 10 AWG wire to the assembly leads with suitable preinsulated connectors. Make the crimped splice with a tool that requires a complete crimp before releasing. Make the splices at staggered locations.

3 L-852, Type II Light Assembly. Place the No. 10 AWG wires in the wireways from the transformer near the taxiway edge and into the base. Provide slack wire inside the base to permit connections of the No. 10 AWG wires and the base light assembly leads to be made above ground. Splice the No. 10 AWG wires to the light assembly leads with suitable preinsulated connectors. Make the crimped splices with a tool that requires a complete crimp before releasing. Clean the outer surface of cable over which insulating tape will be placed. Apply vinyl pressure sensitive tape 1/2 lapped beginning over the preinsulated splice. Proceed to build up 1/2-lapped tape to 1-1/2 times the cable diameter over the entire splice with ends tapered a distance of 1 inch over the original jackets.

(f) Sealing. Seal the wires in the sawed wireways and dummy joint in the following consecutive steps:

1 Step 1. Prior to placing wires in the sawed wireway, remove all foreign material and joint sealer material from the dummy joint in the longitudinal area to be used as a wireway.

2 Step 2. Anchor the wires to the bottom of the sawed wireways and the dummy joint using an adequate number of wedges or similar devices.

3 Step 3. Fill the wireways in flexible pavement and dummy joints of rigid pavement with P-605, Type III joint sealer to a maximum of 1/8 inch below pavement surface. Fill sawed wireways in rigid pavement with P-606 liquid sealer.

4 Step 4. Remove any excess joint sealer material or liquid sealer from the pavement surface.

(g) Light Base and Transformer Housing Installation. Install a light base and transformer housing in undisturbed soil with a concrete backfill having a diameter of 24 inches at the locations specified on the plans. Prior to placing the concrete around the base, check the orientation of the entrance hubs to make sure they are oriented in the proper direction and check the level of the base to assure that it is level within two degrees of the finish grade. Slope the top of the concrete away from the flange portion of the base so that a minimum of concrete is exposed above the soil around the base. See Appendix 2, Figure 8, for a typical transformer housing installation.

(h) Cable Installation.

1 General. Install all primary cables and control cables by direct burial in trenches where routing is under areas not paved or stabilized in accordance with Item L-108.

2 Primary Cable Installation. Install primary cable in a trench from the regulator into a light base and transformer housing in the field. Provide slack cable in each light base and transformer housing to permit connections of the primary cable and the insulating transformer primary leads to be made above ground. Seal the cable entrance of the light base transformer housing with squeeze connectors, where specified. These squeeze connectors are provided with a rubber bushing of the correct size to fit the outside diameter of the cable. Tighten the squeeze connectors to provide a watertight seal without deforming the insulation and jacket of the cable. Tape the ends of cables to prevent the entry of moisture until connections are made. See Appendix 2, Figure 5, for trench detail and wire placement.

3 Primary Cable Connections. Make in-line splices on the primary underground cables to conform to Item L-108. Use connectors conforming to Advisory Circular 150/5345-26. Splices in ducts, conduits, or in the primary cables between light base and transformer housings are not allowed. When field attached plug-in connectors are employed, use a crimping tool designed for the specific type connector to assure that crimps or indents meet the necessary tensile strength. Wrap the connector joints in the primary circuit with at least one layer of rubber or synthetic rubber tape and one layer of plastic tape, one half lapped, extended at least 1-1/2 inches on each side of the joint.

4 Secondary Lead Connections. Make connections to the secondary insulating transformer leads and the No. 10 AWG with a disconnecting plug and receptacle conforming to Advisory Circular 150/5345-26. Attach the L-823 connector, Figure 15, of Advisory Circular 150/5345-26 on the end of the two No. 10 AWG wires using a crimping tool designed for this connector to assure a crimp or indent meets the necessary tensile strength. Insert this Figure 15 connector into the transformer secondary plug. See Appendix 2, Figures 7 and 8, for typical secondary wiring details.

(i) Identification Numbers. Assign identification numbers to each station (transformer housing installation) in accordance with the plans. Place the numbers to identify the station by one of the following methods:

1 Stencilling. Stencil numbers of two-inch minimum height using black paint on the taxiway side of the transformer housing base plate.

2 Metal Disc. Attach a noncorrosive disc of two-inch minimum diameter with numbers permanently stamped or cut out under the head of a transformer housing base plate bolt.

3 Paint. Impress on a visible portion of the concrete backfill numbers of three-inch minimum height.

(j) Duct and Cable Markers. Mark all locations of the ends of ducts and all direct earth burial cable with a concrete marker slab in accordance with Items L-108 and L-110. See Appendix 2, Figure 5, for duct and cable marker details.

(k) Reflective Markers. Install reflective markers, where required adjacent to the taxiway edge, on paved fillets and on curves of radii less than 800 feet (measured to the taxiway centerline). Locate and space reflective markers as specified in Advisory Circular 150/5340-15A for taxiway edge lighting. Supplemental reflective markers may be installed in ramp areas.

8. TESTING AND INSPECTION.

a. General. Because certain components may be inaccessible after final installation, inspect and test taxiway centerline lighting concurrently with installation.

b. Secondary Services Circuits. Test the secondary services circuit for each subsection for continuity and insulation resistance to ground before the wireways are filled with a sealant. Use a 500-volt megger for the insulation resistance test. A circuit resistance of at least 50 megohms is acceptable.

c. Elevation. Check the light unit installation procedures during construction and after the system has been completed to determine that the recommended fixture elevation is in accordance with design and installation requirements.

d. Alignment. Check the light unit installation procedures during construction and the completed system to determine that the fixture alignment is in accordance with design and installation requirements. Make final adjustments at night and to the satisfaction of the engineer in charge.

e. Securing Screws or Bolts. Determine that all fixture securing screws or bolts have been tightened in accordance with the manufacturer's recommendations.

f. Light Channels and Lenses. Visually check each light fixture to determine that the lenses and the channels in front of the lenses are clean.

g. Primary and Control Cables. Test the primary and control cables as specified under the applicable sections of Item L-108.

h. Operational.

(1) General. Before connecting and energizing the regulator, make a 24-hour recording of the primary input voltage to determine which regulator voltage tap to use. If the maximum input voltage exceeds the 250-volt maximum tap, correct the input voltage. Install lamps in all light fixtures for check out. Operations with excessive open insulating transformer loads can damage a monocyclic type resonant circuit regulator.

(2) Open-Circuit Protection. Check the open-circuit protective device only once, then allow a five-minute cooling period before rechecking. Continuous cycling of the protective device can overheat and burn out the thermal relay.

(3) Complete System Operation. Test the installation by continuous operation for not less than one half hour as a complete system including the functioning of each control not less than ten times. Test the completed circuits in accordance with the applicable provisions of Item L-108.

(4) Equipment. Check equipment covered by FAA specifications to determine if the manufacturers are approved suppliers. Check the equipment for conformance with specification requirements.

(5) Transformer and Feeder Fusing. Check to determine that the primary (high voltage) fuses for transformers and feeders do not exceed 200 percent of the rating of the transformer. Secondary (low voltage) fuses for transformers and feeders shall not exceed 125 percent of the transformer rating.

(6) Vault Equipment. Test the vault equipment as specified in Item L-109. Include a check to determine that the resistance to ground of any part of the grounding system will not exceed 10 ohms.

(7) Equipment. Subject all regulators and other applicable equipment to performance tests specified in the manufacturer's instructions.

(8) Cables, Wiring, and Splices. Check all cables, wiring, and splices to obtain assurance that the installation is in accordance with Item L-108. Check underground cables and wire in saw kerfs before the installation is completed.

(9) Ducts and Duct Markers. Assure that all ducts and duct markers are installed in accordance with Item L-110. Check underground ducts before installation is completed.

9. MAINTENANCE.

a. General. A maintenance program is necessary at airports with taxiway centerline lights to insure proper operation and dependable service from the equipment. The taxiway lighting system may be of the highest order of reliability but its effectiveness will soon depreciate unless it is properly maintained.

(1) Schedule. Adopt a systematic maintenance schedule to insure maximum efficiency by detecting faults and avoiding deterioration of the system. The lighting system can become ineffective for many periods during the year if maintenance is not performed.

(2) Proper Maintenance. Proper maintenance consists of a regular schedule of testing, cleaning, adjusting, repairing, and replacing worn-out or damaged parts. Dirty equipment contributes greatly to operation failure; therefore, keep all equipment free of dust, sand, surplus grease and oil, and other foreign material. Replace all lamps and broken glassware. Periodically clean the lens reflector and light channel in front of the lens in accordance with manufacturer's recommendations. Weather and the location of the fixture will dictate the regularity and type of cleaning.

(3) Snow Removal. Recommended snow removal techniques are described in Advisory Circular 150/5380-2A. Snowplow operators must exercise extra care not to strike the lighting fixtures with snowplow blades. After snow removal operations, inspect all lighting fixtures to locate and replace, if necessary, all damaged light assemblies.

b. Operational Check and Test. Make a daily check of the lighting system and operation of equipment at least one hour before sunset. The daily check of the lighting system consists of a driving patrol to visually check for dimly burning lamps and burned out lamps which are recorded for later maintenance check and for replacement of defective and burned out lamps. Assign the daily operational test of equipment to a reliable and competent person stationed at the airport during the evening hours who has been fully checked out on procedures to follow. These procedures consist of turning on all airport taxiway centerline lighting systems to determine that each circuit is functioning normally. Notify the maintenance electrician immediately when a malfunctioning of any lighting circuit is noted.

c. Relamping. Notify tower personnel when relamping is to begin. De-energize the constant current regulator supplying the primary series circuit to the taxiway centerline lighting system containing the burned out lamps in accordance with established safety standards and procedures. Remove the light assembly or lamp assembly and replace the lamp. Replace the gaskets if they appear to be worn or damaged. Clean and dry out the assembly before replacing the light assembly or lamp assembly. Properly seal all gaskets. Tighten all screws, bolts, and other securing hardware with a torque wrench or screwdriver in accordance with manufacturer's recommended torque. Re-energize the primary circuit to the regulator in accordance with established safety standards and procedures. Notify tower personnel that maintenance work is completed and have them check the brightness setting from their remote station.

d. Removal of Water. Taxiway centerline lighting assemblies are designed to exclude both ground and surface water from entering critical areas. Where below-freezing temperatures are encountered, water left in the assembly can become a serious problem. Ice within the assembly can cause damage to the assembly by shearing the top assembly or lamp assembly holddown hardware or rupturing the top assembly or lamp assembly. Adopt a regular schedule for tightening securing screws, bolts, and other securing hardware. Where water is noted, remove the water and clean and dry lenses, receptacle, lamp, and electrical contacts.

e. Cables. Megger homeruns of cable with a 500-volt megger after the installation has been accepted. Record and retain the megger readings. Make monthly readings and compare these readings with the initial values recorded to determine existing conditions of the system. The initial megohm resistance value in an acceptable system should not be less than 50 megohms. Take corrective steps promptly when monthly megger checks reveal progressive deterioration or faults. Open circuits and grounded circuits are the most common faults in series underground cable.

(1) Monthly Megger Checks. Monthly megger checks are accomplished by first notifying tower personnel that maintenance work is to start. De-energize the regulator in accordance with established safety standards and procedures. Disconnect the series cable leads at the regulator. Connect one lead of the megger to the series cable and the other lead of the megger to a proven ground. Operate the megger in accordance with established safety standards and procedures. Notify tower personnel when maintenance work has been completed. Check operation of the regulator by instructing the tower personnel to operate the regulator through all brightness settings from the remote control panel.

(2) Trouble Shooting Series Circuits. Only authorized personnel should be allowed to trouble shoot on series lighting circuits because of the high open circuit voltages encountered when the primary of a series circuit is open-circuited. Open circuit voltages as high as 2,270 volts may be encountered in a series circuit connected across a 7-1/2KW, 6.6-ampere regulator. Regulators having a higher KW capacity and the same current rating will have a greater open circuit voltage. Trouble shooting for taxiway centerline lighting systems is complicated by the fact that some of the interconnecting wires are sealed in the taxiway pavements. It is important, for this reason, to check the system wiring during installation and to establish an effective preventative maintenance program.

f. Vault. Keep the vault clean and uncluttered to prevent dirt from accumulating in control compartments and to allow equipment to be accessible at all times. Mount legible warning signs in conspicuous locations.

APPENDIX 1. BIBLIOGRAPHY

1. Obtain copies of the following publications from the Department of Transportation, Distribution Unit, TAD-484.3, Washington, D.C. 20590.

   a. AC 150/5340-9, Prefabricated Metal Housing for Electrical Equipment.

   b. AC 150/5340-13A, High Intensity Runway Lighting System.

   c. AC 150/5340-15A, Taxiway Edge Lighting System.

   d. AC 150/5345-3A, Specification for L-821 Airport Lighting Panel for Remote Control of Airport Lighting.

   e. AC 150/5345-6, Specification for L-809 Airport Light Base and Transformer Housing.

   f. AC 150/5345-7, Specification for L-824 Underground Electrical Cables for Airport Lighting Circuits.

   g. AC 150/5345-10B, Specification for L-828 Constant Current Regulator With Stepless Brightness Control.

   h. AC 150/5345-11, Specification for L-812 Static Indoor Type Constant Current Regulator Assembly; 4KW and 7-1/2KW; With Brightness Control for Remote Operation.

   i. AC 150/5345-13, Specification for L-841 Auxiliary Relay Cabinet Assembly for Pilot Control of Airport Lighting Circuits.

   j. AC 150/5345-15, Specification for L-842 Airport Centerline Light.

   k. AC 150/5345-22, Specification for L-834 Individual Lamp Series-To-Series Type Insulating Transformer for 5000 Volt Series Circuit.

   l. AC 150/5345-26, Specification for L-823 Plug and Receptacle Cable Connectors.

   m. AC 150/5345-29, FAA Specification L-852, Light Assembly, Airport Taxiway Centerline.

   n. AC 150/5345-30A, Specification for L-846 Electrical Wire for Lighting Circuits to be Installed in Airport Pavements.

   o. AC 150/5345-35, Specification for L-816 Circuit Selector Cabinet Assembly for 600 Volt Series Circuit.

p. AC 150/5380-2A, Snow Removal Techniques Where In-Pavement Lighting Systems are Installed.

2. Obtain military specifications from Commanding Officer, Navy Supply Depot, 5901 Tabor Avenue, Philadelphia, Pennsylvania 19120, Attention: Code CDS.

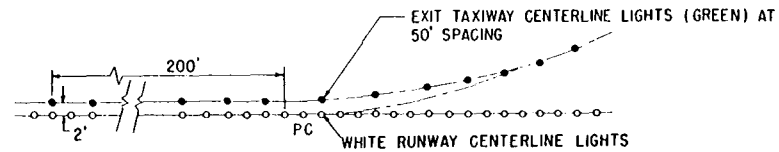
   a. MIL-T-27535A (ASG), Transformer, Power, Isolation: Series Circuit, Airport Lighting, General Specification for.

   b. MIL-R-7264B (USAF), Reflector, Taxiway Strip and Runway, Type B-1.

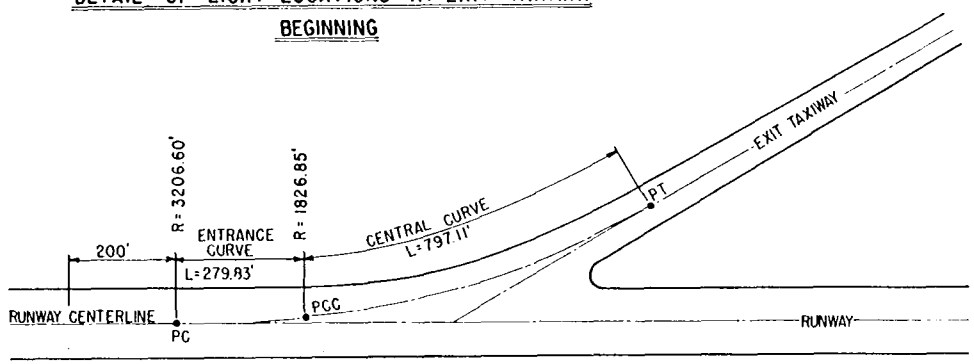
3. Obtain Federal Specification L-S-300, Sheeting and Tape, Reflective; Nonexposed Lens, Adhesive Backing, from the appropriate Regional General Services Administration Office.

4. Obtain copies of AC 150/5370-1A, Standard Specifications for Construction of Airports, from the Superintendent of Documents, United States Government Printing Office, Washington, D.C. 20402. Send check or money order with your request made payable to the Superintendent of Documents in the amount of $3.50 for each copy. No c.o.d. orders accepted.

5. Obtain copies of Rural Electrification Administration (REA) Bulletin 345-14, REA Specification for Fully Color-Coded, Polyethylene Insulated, Double Polyethylene-Jacketed Telephone Cables for Direct Burial, from the U.S. Department of Agriculture, Rural Electrification Administration, Information Services Division, Washington, D.C. 20250.



DETAIL OF LIGHT LOCATIONS AT EXIT TAXIWAY BEGINNING



LONG RADIUS EXIT TAXIWAY (TYPICAL)

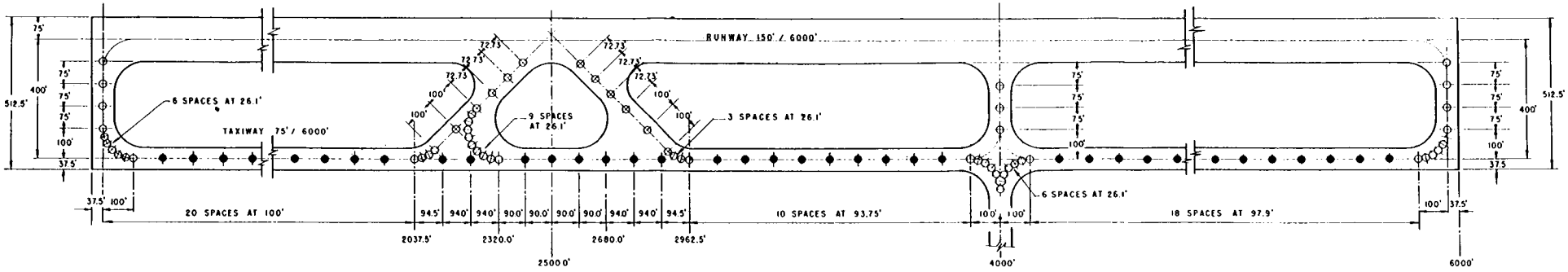
NOTES:

Undirectional inset L-842 Type I Style A lights will normally be used for this application. However bidirectional L-842 Type II, Style A units are used where it is desired to provide guidance for emergency vehicles approaching from the ramp area. Orientation of light beams shall be as follows:

(a) For Unidirectional lights, the axis of the beam shall be "toed - in" to intersect the centerline at a point approximately equal to four times the spacing of lights on the curve portion, and such spacing shall be measured along the chord of the curve.

(b) For bidirectional lights, the axes of the two beams shall be oriented parallel to the tangent of the nearest point of the curve designated as the true centerline of the taxiing path.

FIGURE 1. LONG RADIUS EXIT TAXIWAY CENTERLINE LIGHTING.



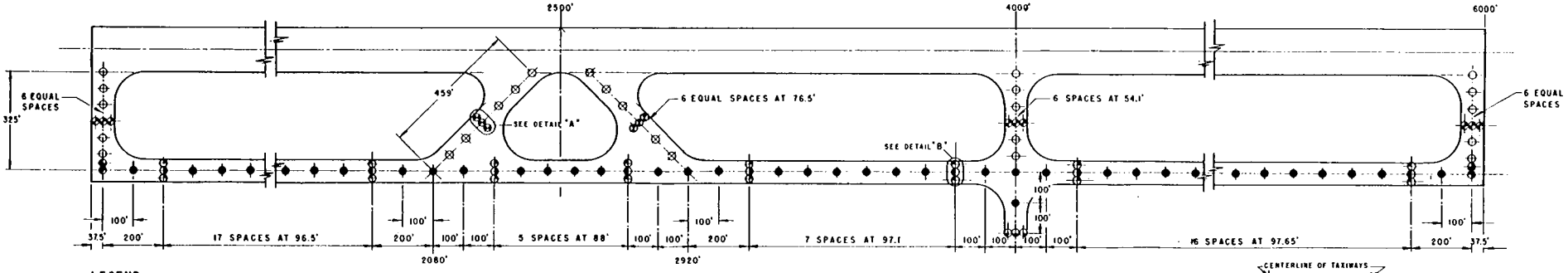
LEGEND

- ○ L-852 BIDIRECTIONAL - GREEN - GREEN
- ● L-842 BIDIRECTIONAL - GREEN - GREEN

NOTES

1. RUNWAY AND TAXIWAY FILLETS ARE IN ACCORDANCE WITH AC150/5335-1, AIRPORT TAXIWAYS, FIGURE 2 ATTACHMENT 1.
2. LONGITUDINAL SPACING OF LIGHTS SPECIFIED IN PARAGRAPH 4B PAGE 1 OF THIS CIRCULAR WAS ADHERED TO AS CLOSELY AS POSSIBLE.
3. ORIENTATION OF LIGHT BEAMS SHOULD BE AS SPECIFIED IN 4G (1) AND 4G (2), PAGE 2, OF THIS CIRCULAR.

FIGURE (A) LIGHTING CONFIGURATION FOR CURVED PORTIONS (FIXTURES ON CURVED CENTERLINE)



LEGEND

- L-852 BIDIRECTIONAL - GREEN - GREEN
- L-852 BIDIRECTIONAL - YELLOW - YELLOW
- L-852 BIDIRECTIONAL - BLANK - YELLOW
- L-852 BIDIRECTIONAL - GREEN - YELLOW
- L-852 UNIDIRECTIONAL - GREEN - BLANK
- L-842 BIDIRECTIONAL - GREEN - GREEN

TABLE "A"

TAXIWAY LENGTH	LONGITUDINAL SPACING
UP TO 350'	25'
351' TO 450'	50'
451' TO 500'	75'
500' OR GREATER	100'

NOTES

1. IN DETERMINING SPACING OF LIGHTS ON SHORT STRAIGHT SECTIONS, DO NOT CONSIDER THE FIRST 150' FROM CENTERLINE OF RUNWAY OR TAXIWAY SINCE THIS LENGTH IS OF SECONDARY VALUE FOR GUIDANCE WHERE LONG-BODIED AIRCRAFT ARE INVOLVED. INSTALLATION OF MINIMUM OF FOUR LIGHTS IS REQUIRED IN REMAINING DISTANCE FOR SHORT TAXIWAY SECTIONS. SEE TABLE "A" FOR SPACING OF WIDE BEAM L-852 TAXIWAY LIGHTS ON SHORT SECTIONS OF TAXIWAY.
2. EACH TAXIWAY CONFIGURATION SHOULD BE STUDIED TO DETERMINE THE LOCATIONS OF HOLD-BARS TO MEET SPECIFIC OPERATIONAL REQUIREMENTS. HOLD-BAR LOCATIONS SHOWN ARE FOR ILLUSTRATION AND THEY MEET SPECIFIED 100' MINIMUM TO 200' MAXIMUM OF AC150/5340-1A

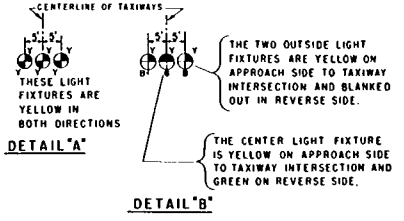
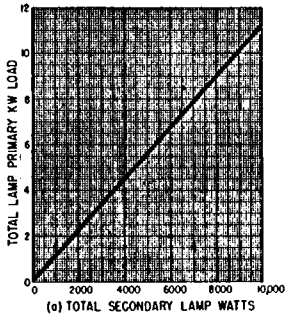
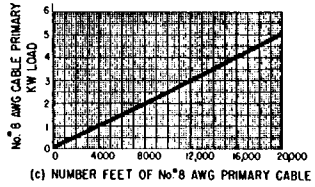


FIGURE (B) ALTERNATE LIGHTING CONFIGURATION FOR CURVED PORTIONS (FIXTURES ON STRAIGHT CENTERLINES)

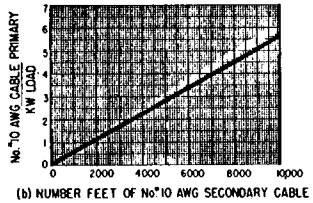
FIGURE 2. LIGHTING CONFIGURATION FOR TAXIING OPERATIONS DOWN TO 1,000 FEET RVR



(a) TOTAL SECONDARY LAMP WATTS



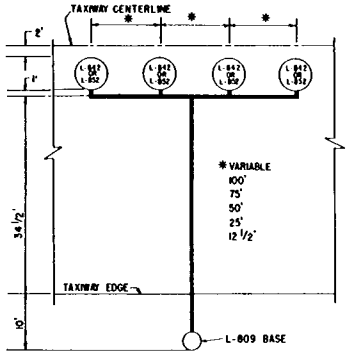
(c) NUMBER FEET OF No. 8 AWG PRIMARY CABLE



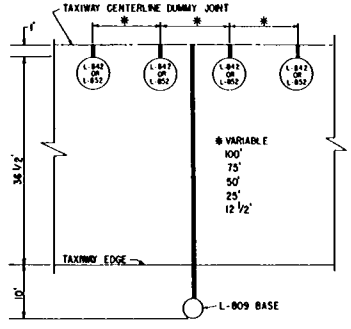
(b) NUMBER FEET OF No. 10 AWG SECONDARY CABLE

NOTE

1. The lighting fixtures may be installed 2' off the centerline of the taxiway to eleminate masking of each fixture during painting of taxiway centerline, or to avoid construction joints or other undesirable spots. see paragraph 4b.



(d) STATION "A" FLEXIBLE PAVEMENT



(e) STATION "B" RIGID PAVEMENT

HOW TO OBTAIN THE 6.6 AMPERE PRIMARY KW LOAD

SAMPLE CALCULATIONS

1. Assumption. A taxiway centerline lighting configuration composed of 22 stations of four lights per station spaced longitudinally at 100 feet as shown in Figure 6f Station "A" Flexible Pavement. Ten stations of L-852 light fixtures (65 watts per fixtures) and twelve stations of L-842 light fixtures (45 watts per fixtures) with a cable home-run separation distance of 2,500 feet.

a. Total Lamp Secondary Watts.

10 stations x 4 lights/station x 65 watts/fixture = 2,600 watts
12 stations x 4 lights/station x 45 watts/fixture = 2,160 watts

Total Lamp Secondary Watts = 4,760 watts

b. Total Lamp Primary Watts

From graph (a) 4,760 watts total lamp secondary load equals 5.5KW total primary lamp load.

c. Total Number Feet of Number 10 AWG Secondary Cable.

From lighting configuration Figure 6f), we have a 300 foot longitudinal saw kerf, four vertical saw kerfs of 1 feet, one vertical saw kerf from edge of taxiway pavement to the 300 foot longitudinal saw kerf of 33 1/2 feet and a distance of 10 feet from taxiway edge to the L-809 base housing.

300 feet longitudinal saw kerf x 2 (number of cables) =	600 feet
1 foot vertical saw kerf x 4 (number of saw kerfs) x 2 (number of cables) =	8 feet
34 1/2 feet vertical saw kerf x 1 (number of saw kerfs) x 2 (number of cables) =	69 feet
10 feet taxiway edge to L-809 base x 1 (number of runs) x 2 (number of cables) =	20 feet
Total Number feet of Number 10 cable used per station	697 feet

697 feet Number 8 per station x 22 stations = 15,324 feet total of Number 10 AWG Cable used for 22 stations.

d. Total Number 10 AWG Cable Primary KW Load.

From Graph (b) 15,446 feet of Number 10 AWG Cable = 10,000 feet = 0.548 KW
= 5,324 feet = 0.278 KW
Total Number 10 AWG Primary KW Load 0.796 KW

e. Total Number Feet Number 8 AWG Primary Cable

22 stations as shown in Figure 6f) Station "A" has 21 spaces of 400 feet (separation between L-809 base housings). Also, we have 2,500 feet home-run separation.

21 spaces x 400 feet separation x 2 (number of cables) = 16,800 feet
2,500 feet (home-run separation) x 2 (number of cables) 5,000 feet

Total number feet of Number 8 AWG Primary Cable 21,800 feet

f. Total Number 8 AWG Cable Primary KW Load.

From Graph (c) 21,800 feet Number 8 AWG Cable = 20,000 feet = 0.558 KW
= 1,800 feet = 0.050 KW
Total No. 8 AWG Primary KW Load = 0.608 KW

g. Total 6.6 Ampere Primary KW Load.

Add total KW loads obtained in paragraph b, d and f above.

Paragraph b. = 5.5 KW
Paragraph d. = 0.796 KW
Paragraph f. = 0.608 KW
Total Primary KW = 6.904 KW

FIGURE 3. CURVES FOR ESTIMATING PRIMARY LOAD FOR TAXIWAY CENTERLINE LIGHTING SYSTEMS.

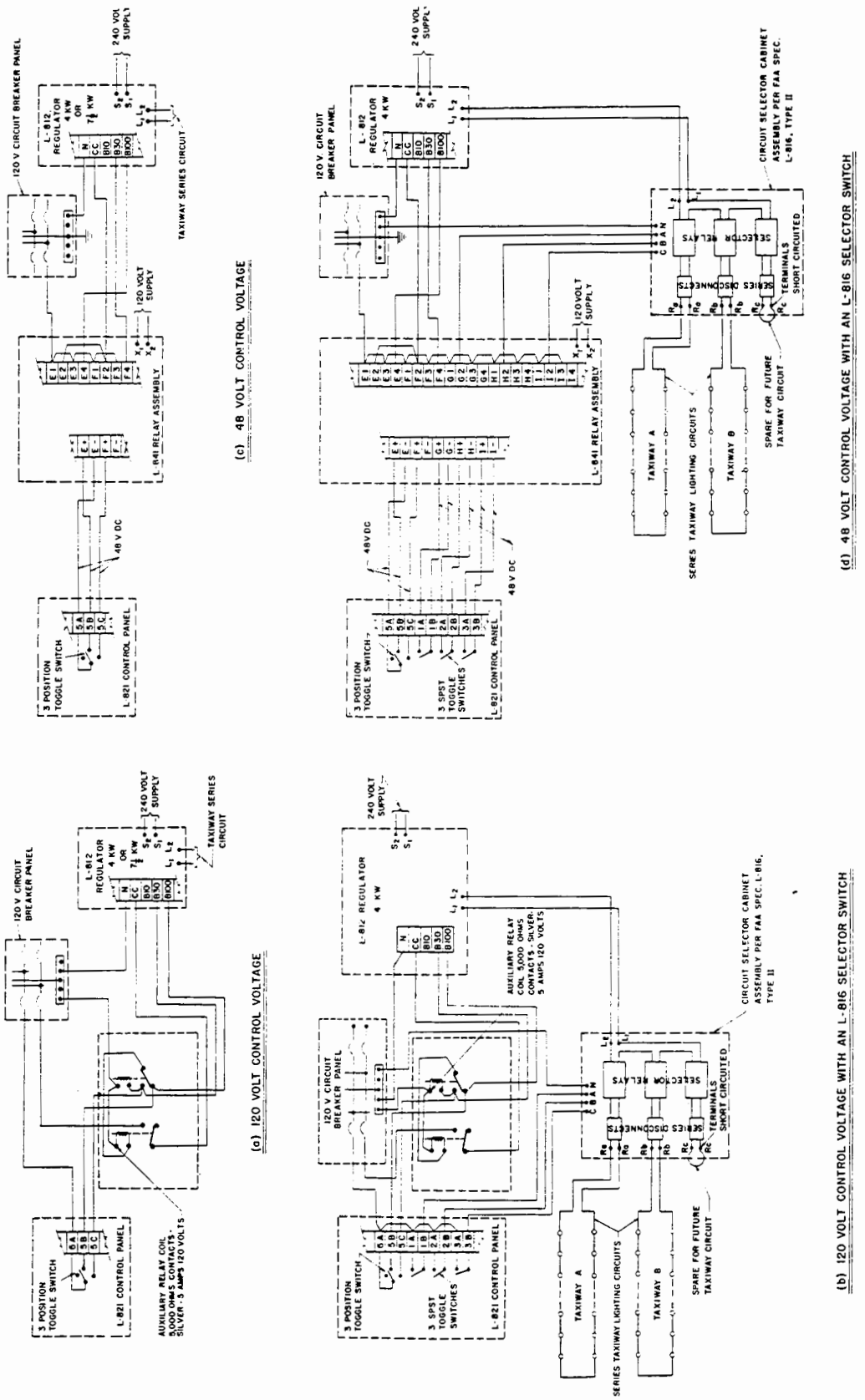
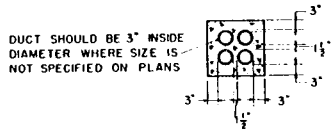
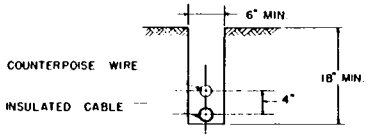


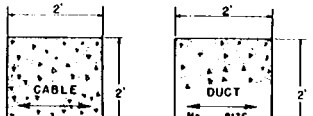
FIGURE 4. TYPICAL 120-VOLT AC AND 48-VOLT DC REMOTE CONTROL FOR TAXIWAY CENTERLINE LIGHTING SYSTEMS.

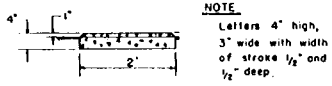


(c) TYPICAL 4 - WAY DUCT DETAIL

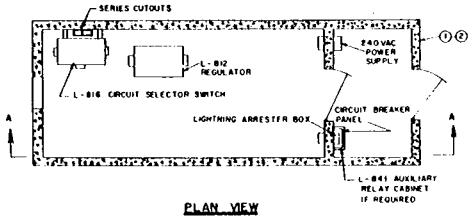


(e) TYPICAL TRENCH DETAIL AND WIRE PLACEMENT

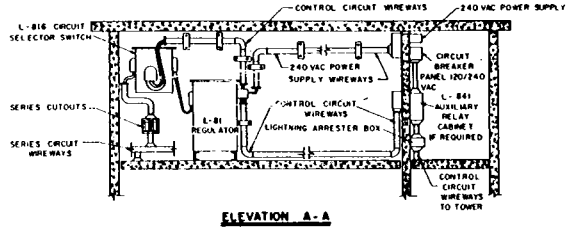




(d) TYPICAL CABLE AND DUCT MARKER DETAIL

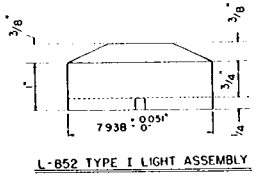


PLAN VIEW

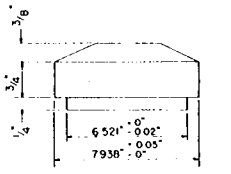


ELEVATION A-A

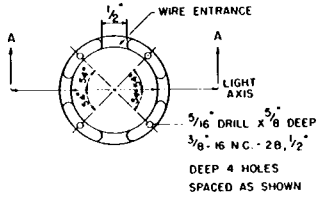
TYPICAL VAULT LAYOUT FOR TAXIWAY LIGHTING EQUIPMENT

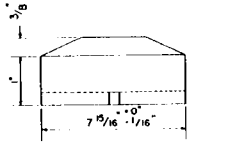


L-852 TYPE I LIGHT ASSEMBLY

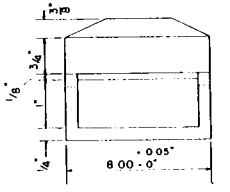


L-852 TYPE II LIGHT ASSEMBLY

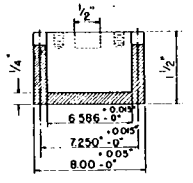




L-842 LIGHT ASSMBLY STYLE A



L-852 TYPE II LIGHT AND BASE

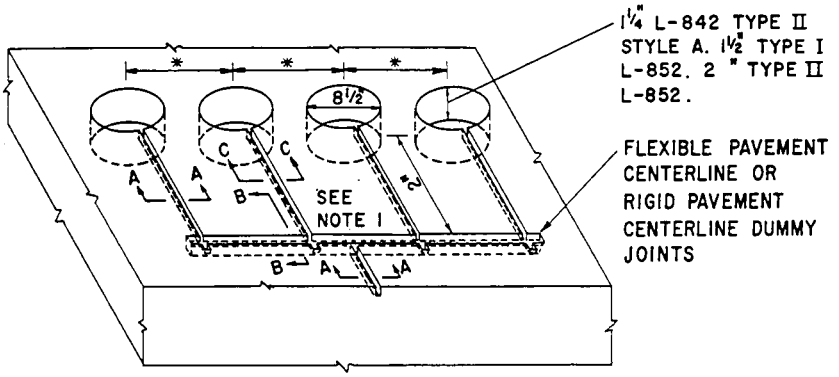


L-852 TYPE II LIGHT ASSEMBLY BASE

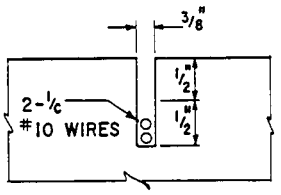
NOTES

1. Vault construction and equipment installation are accordance with the National Code, local codes, Item L-109 of FAA Standard Specifications for Construction of Airports.
2. An adequate number of lighting fixtures and electrical outlet should be provided in the vault.
3. The underground electrical ducts and duct markers are specified in plans. The installations of the ducts and markers are in accordance with Item L-110 of FAA Standard Specifications

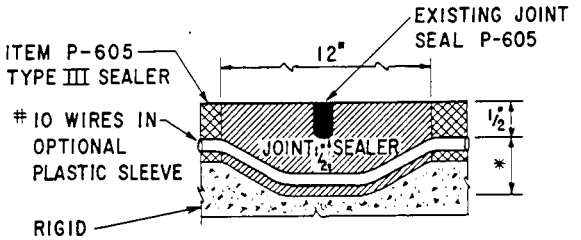
FIGURE 5. TYPICAL VAULT FIXTURE DUCT, TRENCHING, AND DUCT AND CABLE MARKING DETAILS.



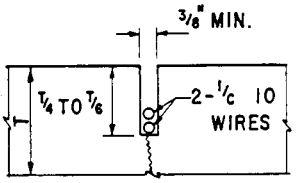
*VARIABLE. SEE FIGURE 1, APPENDIX 2



SECTION A-A

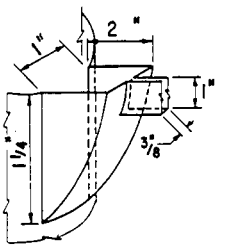


SAWING DETAIL AT
JOINT INTERSECTION
DETAIL A



SECTION B-B

EXISTING TAXIWAY CENTERLINE
DUMMY JOINT USED AS WIREWAY

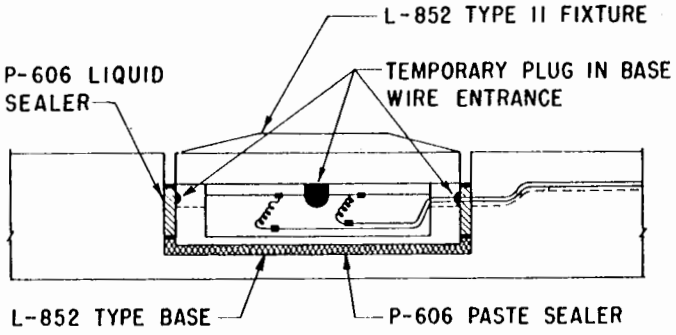


SECTION C-C

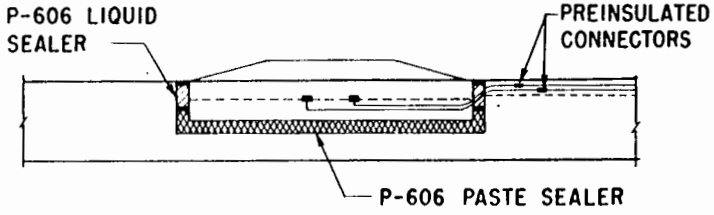
NOTES

1. WIRES ARE NOT LESS THAN ½" BELOW JOINT SEAL COMPOUND.
2. WHEN THERE IS NO EXISTING DUMMY CENTERLINE JOINT SAW LONGITUDINAL WIREWAY IN ACCORDANCE WITH SECTION A - A
3. SECTION C-C DETAIL FOR TYPE II L-852 ONLY. USE DETAIL SECTION A-A FOR TYPE I L-852 AND L-842 INSTALLATION.

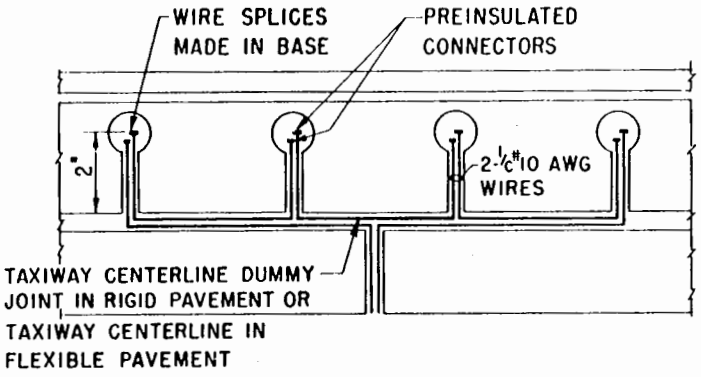
FIGURE 6. SAWING AND DRILLING DETAILS FOR TYPE I, II AND III LIGHT ASSEMBLIES.



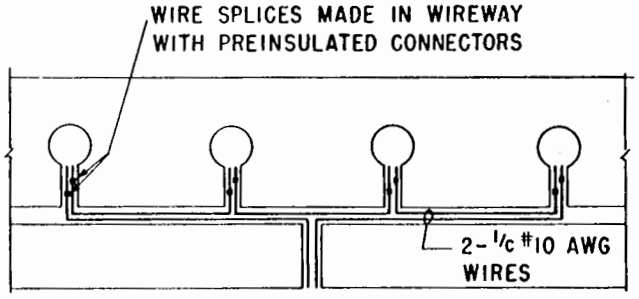
TYPE II L-852 LIGHT ASSEMBLY



L-852 TYPE I AND L-842 STYLE A LIGHT ASSEMBLIES

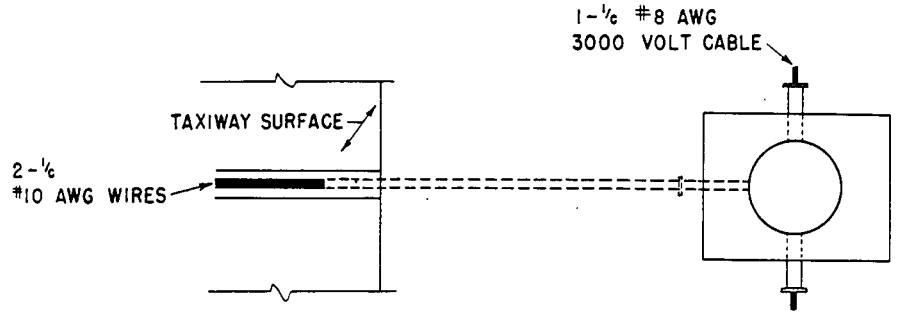


WIRING DIAGRAM FOR TYPE II L-852 LIGHT ASSEMBLY

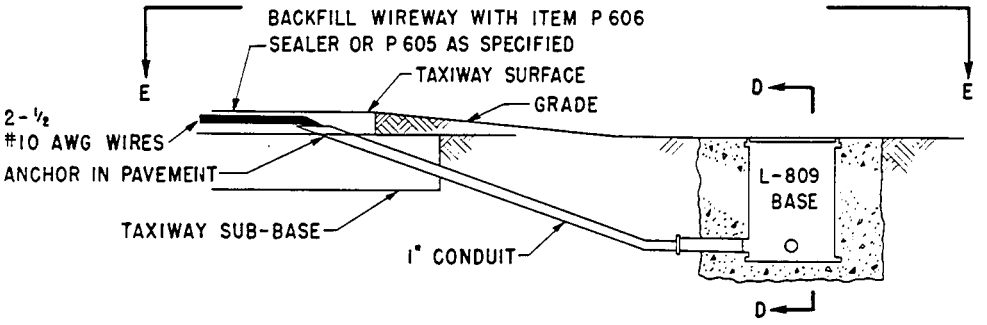


WIRING DIAGRAM FOR TYPE I L-852 AND L-842 STYLE A LIGHT ASSEMLIES

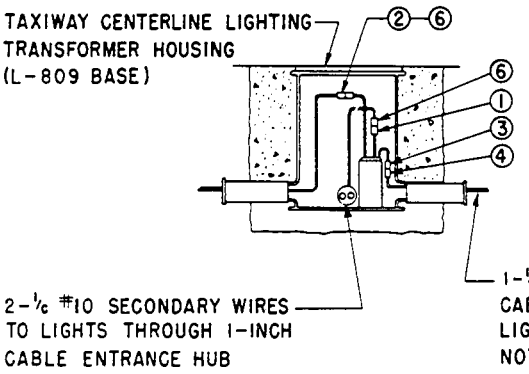
FIGURE 7. WIRING DETAILS FOR TYPE L-852 AND L-842 FIXTURE ASSEMBLIES.



VIEW E-E



TYPICAL TRANSFORMER HOUSING INSTALLATION DETAILS



CONNECTOR	SPECIFICATION L-823 FIGURE NUMBER
1	1c
2	6a
3	6b
4	14a
5	14b
6	15

SECTION D-D

NOTES

1. THE PRIMARY CABLES ARE INSTALLED IN ACCORDANCE WITH ITEM L-108 OF STANDARD SPECIFICATIONS FOR CONSTRUCTION OF AIRPORTS.
2. THE L-809 LIGHT BASE AND TRANSFORMER IS INSTALLED IN ACCORDANCE WITH PARAGRAPH 7b (2)(g).

FIGURE 8. TYPICAL TRANSFORMER HOUSING INSTALLATION DETAILS.

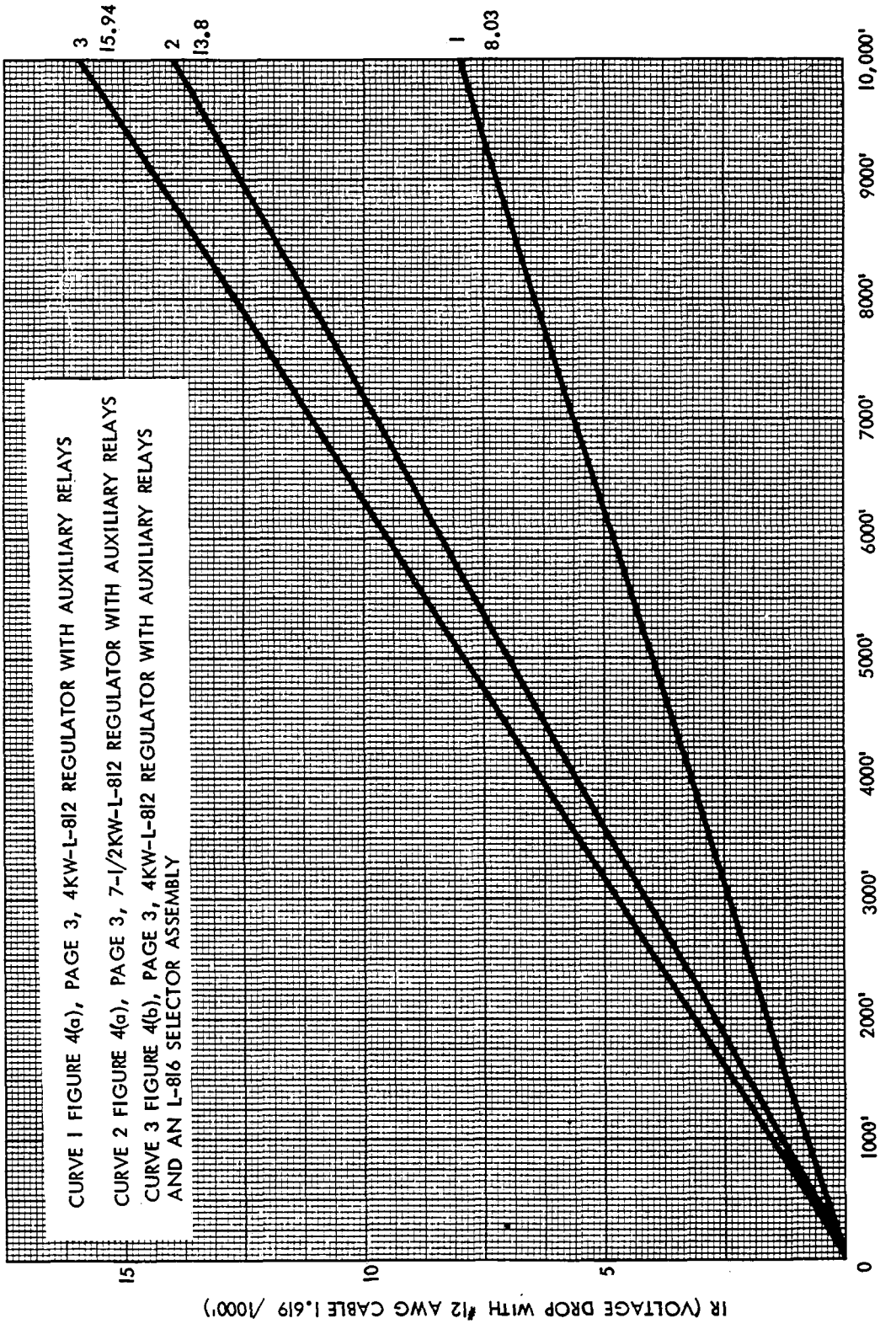


FIGURE 9. CURVES FOR DETERMINING MAXIMUM SEPARATION BETWEEN VAULT AND CONTROL PANEL.

*U. S. GOVERNMENT PRINTING OFFICE : 1969 O - 330-478